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Purdy, Eve; Alexander, Charlotte; Caughley, Melissah; Bassett, Shane; Brazil, Victoria

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ORIGINAL CONTRIBUTION

Identifying and Transmitting the Culture of Emergency Medicine Through Simulation

Eve Purdy, MD, Charlotte Alexander, MD, Melissah Caughley, MD, Shane Bassett, and Victoria Brazil, MD, MBA

ABSTRACT

Background: Simulation is commonly used in medical education. It offers the opportunity for participants to apply theoretical knowledge and practice nontechnical skills. We aimed to examine how simulation may also help to identify emergency medicine culture and serve as a tool to transmit values, beliefs, and practices to medical learners.

Methods: We undertook a focused ethnography of a simulated emergency department exercise delivered to 98 third-year medical students. This ethnography included participant observation, informal interviews, and document review. Analysis was performed using a recursive method, a simultaneous deductive and inductive approach to data interpretation.

Results: All 20 staff (100%) and 92 of 98 medical students (94%) participated in the study. We identified seven core values—identifying and treating dangerous pathology, managing uncertainty, patients and families at the center of care, balancing needs and resources at the system level, value of the team approach, education as integral, and emergency medicine as part of self-identity—and 27 related beliefs that characterized emergency medicine culture. We observed that culture was transmitted during the simulation exercise.

Conclusion: This study contributes to the characterization of the culture of emergency medicine by identifying core values and beliefs that are foundational to the specialty. Simulation facilitated cultural compression, which allowed for ready identification of values, beliefs, and practices and also facilitated transmission of culture to learners. This study expands understanding of the culture of emergency medicine and the role of simulation in the process of cultural exchange.

Simulation is common in medical education, particularly emergency medicine education.[1,2] It offers the opportunity for learners to apply theoretical knowledge and to practice technical and nontechnical skills.[1,3] We aimed to examine how simulation may also serve as a tool to transmit emergency medicine culture to learners, specifically, medical students.

Culture is a rather nebulous term. Even anthropologists, who are experts in the study of culture, have struggled with a unifying definition.[4] One variation is that culture is a learned set of values, beliefs, and practices shared amongst a group of people (Table 1).[5–7] Since culture is learned and taught, focus on education is critical for understanding culture and cultural reproduction in medicine.[5]

Traditionally, medical learners spend extended periods of time in a clinical department with close mentors in an apprenticeship type model. During this time, they

From the Queen's University (EP), Kingston, Ontario, Canada; Gold Coast University Hospital (EP, CA, VB), Southport, Queensland, Australia; and Bond University (MC, SB, VB), Robina Queensland, Australia.
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Address for correspondence and reprints: Eve Purdy, MD; e-mail: epurdy@qmed.ca.
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Table 1
Key Definitions Related to Culture

	Values	Beliefs	Practices
Definition	Ideas and principles that a group holds to be particularly important and worthy.[7]	Assumptions that are made about the world and concepts that are held to be true whether or not they in fact are.[6]	The application of a value or belief in behavior, communication, or action.

acquire knowledge and skills and also develop an understanding of how to belong through the acquisition of cultural knowledge and through the influence of the hidden curriculum. This type of medical learning still occurs; however, modern educational interventions support the transmission of culture in an expedited fashion, a process known as cultural compression.[8] Formal assessment is the prototypical example of cultural compression, in that assessments strongly signal the values of teachers to learners.[8] Cultural compression takes place when individuals experience "culturally normative restrictions" and when "the norms of his group and society bear in upon him with the greatest intensity."[8]

With this definition in mind, we suggest that simulation also likely acts as a tool of cultural compression in medical education. This is supported by the largest ethnography of simulation education to date, which showed that the way that scenarios are written, the dramatization of disease, and the social function of doctors may be reinforced in simulation-based courses.[9] The way that narratives are designed and the way that participants are positioned in these narratives goes far beyond teaching medical and technical skills. It reinforces ideology about the profession and transfers social values, beliefs and practices. This makes understanding how we transmit culture, both deliberately and implicitly, in simulation activities paramount to understanding its role in medical education and enculturation.

The study of emergency medicine culture is not a robust field. In the most overarching ethnography to date, four domains—cognitive, environmental, linguistic, and social—were found to be of particular importance when examining emergency department (ED) culture.[10] Studying a simulation exercise through those domains affords the added opportunity to reflect on the actual culture of emergency medicine that is being transmitted. Values and beliefs of a group can be more apparent when those who already belong are actively enculturating others. As such, we aimed to identify key aspects of emergency medicine culture that were made more obvious through simulation and examine how those values, beliefs, and practices were transmitted to medical students in the exercise.

METHODS

We undertook a focused ethnography of a simulated ED exercise delivered to 98 third-year medical students over 2 days. This ethnography included participant observation, informal interviews, and document review.

The Simulation Exercise and Participants

The simulated ED took place in November 2018 at Bond University in Queensland, Australia, as a preexisting component of the curriculum. Bond University medical school program is 5 years in duration. Students were in their third year, which serves as a transition between classroom and clerkship with frequent simulations, a comprehensive case-based curriculum, and early clinical exposure. This learning activity took place about 2 months before students were scheduled to start formal clinical rotations. Students were scheduled to spend 2 hours in a simulated ED run by nurses, emergency medicine trainees, and consultants. Students performed histories and physical examinations on simulated patients, reviewed cases with senior doctors, ordered and followed up tests, and determined disposition for patients. The simulated department, patient presentations (Table 2), and procedures were designed to be as realistic as possible to the hospital experience. There were 15 simulated patients playing multiple cases and 20 staff (nurses, emergency trainees, consultants). Staff acted as ED supervisors but also played roles such as switchboard, consulting specialists, pathology, and radiology. Within these open roles they had liberty to act as they usually would or as they believe their colleagues would. Students and staff were prebriefed, participated in a 2-hour shift, and then handed over their patients to the next team of students who continued care and also were assigned new patients. Most students cared for a total of three patients in the exercise. There were a total of four 2-hour shifts per day. Students participated in a debrief after each shift. There was no assessment linked to this mandatory learning activity. More details on the design and delivery of the simulation exercise can be found in a previously published innovation report.[11]

Table 2
Simulated Patient Presentations

Case	Age	Presentation
1	29 years	Mild allergic reaction
2	61 years	Chest pain and STEMI
3	34 years	Food poisoning
4	54 years	Distal radius fracture
5	51 years	Benzodiazepine overdose and alcohol intoxication
6	54 years	Forearm laceration
7	49 years	Severe headache
8	3 weeks	Supraventricular tachycardia
9	67 years	Delirium
10	70 years	Catastrophic hemorrhagic stroke
11	35 years	Ankle sprain
12	46 years	Esophageal food bolus
13	56 years	Pneumonia
14	57 years	Atrial fibrillation
15	49 years	Back pain
16	54 years	Motor vehicle collision—broken ribs
17	39 years	Motor vehicle collision—neck pain
18	48 years	Facial trauma in context of domestic violence
19	38 years	Ectopic pregnancy
20	76 years	Urinary retention
21	36 years	Perforated ulcer

STEMI = ST-elevation myocardial infarction.

Focused Ethnography

Three researchers (EP, CA, MC) conducted focused participant observation throughout the 2 days of simulation exercises for a total of 16 hours each (48 total observation hours) including time in the simulated ED, the prebrief, debriefs, and breaks. Participant observation is a common method in anthropology research whereby researchers learn about the people under study by observing and participating in a group's activities.[12] They focused observations on previously suggested domains to explore ED culture—cognitive, linguistic, social, and environmental.[10] During each 2-hour block, researchers were assigned to focus specifically on one of the four domains in a rotating schedule. Researchers sought clarification and asked informal questions to participants and staff. Documents sent to students and staff in advance of the session, scripts for simulated patients, and charts and documents used throughout the simulation session were also reviewed. The three researchers primarily existed toward the observer end of the participant–observer spectrum; however, they did occasionally drift toward participant by reviewing cases and answering questions as needed in their capacity as residents (EP and CA) and a senior medical student (MC). This type of fluidity can be very helpful in the ethnographic process, allowing the research to build rapport and maintain a culturally definable role.[13] They kept deidentified, handwritten field notes, which were then typed and completed at the end of each day.

Data Analysis

Analysis was performed using a recursive method, a simultaneous deductive and inductive approach to data interpretation. At the end of day 1, data from each domain were coded deductively by the three researchers for identified values, beliefs, and practices. This coding took place in table format in Microsoft Word. Researchers then inductively generated overarching values and identified additional beliefs—both of which can be challenging to explicitly observe—from the initial coded data through a consensus process. VB and SB were available to adjudicate any arising conflicts. On day 2 of the simulation, researchers continued to collect data in each domain but focused observations on the values identified on day 1. They were also permitted and encouraged to record unstructured observations that did not fit into the constructed framework. At the end of day 2, the observations gathered for each value were added to the evidence from day 1. Field notes were further reviewed by EP, CA, and MC to identify additional values that did not fit with the original framework. After day 2, the data, in full and associated analysis, were presented to research collaborators VB and SB for input. The findings were then presented to medical students, residents, and consultants involved in the exercise but external to the research team for member checking. Finally, the value and belief set was shared with emergency medicine personnel external to the research and exercise for more broad member checking.

Ethics

This project was approved by the Bond University Human Research Ethics Committee (VB00025). Students and staff were invited to participate prior to the simulation session, and those who consented received a sticker at the beginning of the day or session. Individuals not wishing to participate did not wear a sticker. Observations were not collected from their encounters and researchers did not approach them for clarifications or questions.

The Research Team

One of the authors, EP, is a Canadian senior emergency medicine resident who is also completing a

master's degree in applied anthropology. She trained the two additional authors, CA and MC, who were involved in data collection over a 2-week period. She was available throughout the data-gathering process to answer or address questions and oversee the process. The remaining authors are Australian. CA is a junior resident and MC a fifth-year medical student and former nurse. Authors, EP, CA, and MC who collected the data would be considered partial insiders to both the medical students and staff participants. SB is a senior ED nurse and clinical skills facilitator at Bond University. VB is conjoint Professor of Emergency Medicine at Bond University and Gold Coast Health Service. We specifically designed a diverse, interprofessional team ranging from junior to senior in rank with the understanding that we each bring a unique lens to the understanding of simulation, medical education, and emergency medicine. At research meetings before the research was conducted and after analysis was complete we collectively reflected on our positioning in this project.

RESULTS

All 20 staff (100%) and 92 of 98 medical students (94%) consented to participate in the study.

Values, Beliefs, and Practices

After day 1, nine values were identified for the initial framework. These were "identifying dangerous pathology," "managing uncertainty," "patients at the center of care," "balancing needs and resources," "emergency medicine as a component of self-identity," "maintenance of hierarchy," "desired personality traits," "team approach," and "any patient, any time." After day 2, the value set was refined to six, after the decision that three of the values were component beliefs of others. "Desired personality traits" and "maintenance of hierarchy" were incorporated into "emergency medicine as part of self-identity" while "any patient, any time" was folded into "patients at the center of care." No new values were identified. After review of data and analysis with VB and SB, a seventh value, "education is integral to emergency medicine," was created with supporting component beliefs and practices. The final set of seven values, 27 beliefs, and representative practices are represented in Table 3. Each of these values and beliefs were identified by each observer in their field notes with multiple examples of related practices that came from all four domains of culture—linguistic, cultural, environmental, social. Some values, such as "identifying and treating dangerous pathology is a key role of emergency physicians," were identified based on the exceptionally high frequency of observation, while others such as "education is integral to emergency medicine" were based on the design of the exercise and less frequent but explicit communication to learners during prebriefs and debriefs.

Modes of Transmission

The modes through which values and beliefs were transmitted varied in nature and subtlety, including explicit discussion, role modeling, and structure of the exercise. The most explicit method was discussion in case reviews with the supervisors "on the floor" and during the prebrief and debrief. During case reviews the values transmitted were most often related to "identifying and treating dangerous pathology is a key role of emergency physicians" and "a cornerstone of emergency medicine is managing uncertainty." In the prebrief and debrief "education as integral to emergency medicine" was a central value, with the facilitator encouraging students to develop a habit for lifelong learning by asking direct questions of their supervisors and discussing the purpose and value of the simulation exercise.

Role modeling of behavior was a common mode of transmission particularly for the value "patients and families at the center of care" and "a team approach is necessary to providing high quality emergency care." Medical students, in the member check, felt strongly that role modeling, then mimicry, occurred frequently and was associated with cultural transmission. Supervisors actively managed patients' symptoms and demonstrated desired communication strategies. Students would then copy these strategies, often borrowing exact phrases.

The structure of the exercise, including the deliberately designed key role nurses played in facilitation and the case mix requiring input from allied health, was a predominant signal for the value "a team approach is necessary to providing high-quality emergency care." The values "emergency medicine is part of self- identity" and "emergency physicians must be expert at balancing needs and resources at the systems level" were more subtly transmitted. This most often occurred in the way that supervisors impersonated colleagues or "managed flow" behind the scenes. These beliefs and values were sometimes, but not consistently, uncovered and explored in the debrief. Certain

Table 3
Values, Beliefs, and Practices in Simulation and Practice

Belief	Practice
Value 1: Identifying and treating dangerous pathology is a key role of emergency physicians	
A systematic approach prevents missing dangerous diagnoses	In the majority of case discussions that we observed there was a conversation around "can't miss diagnoses" and a systematic approach to test interpretation was consistently reinforced. For example, while reviewing a patient's ECG the resident taught the students a systematic approach (rate, rhythm, axis etc.), so as "not to miss anything."
Those with potential life or limb threats take priority	Facilitators were frequently triaging patients and teaching students about that process. For example, when a new shift of students entered the simulation, the facilitator triaged the patients then allocated the first group of students to the patient with chest pain because "she is the most crucial one right now." When students were deciding which patient to sign up for next, one of the supervisors explained triage scores (listed on the board) to them.
Identifying nonurgent diagnoses is less important and someone else's job	Supervisors avoided ordering tests that do not change ED management. While telling other staff about her experience supervising students who managed a patient with urinary retention, likely secondary to BPH, she described how the students wondered whether they should order a prostate specific antigen test then shared that "in my mind I was like %$#* NO, that's not our job. . .obviously I didn't say that, but I was thinking that."
Emergency physicians feel that other specialists don't always share the same urgency for treating life-threatening illness	When impersonating colleagues (surgeons, cardiologists, nursing homes) staff were not scripted and had flexibility to behave in any way that they saw fit. We observed that they often created delays such as "being in theater" or "I'm really busy, I'll get there when I can." After creating delays over the phone staff would often regale each other with tales about a recent time that they "couldn't get a consultant" down to see a patient or recognize urgency of a situation. In the simulation during the case of the patient with a STEMI, the cardiologist said "look, we've got another patient on the table, it's going to be a while. Just stabilize her downstairs." In discussion of this case during the debrief students expressed their frustration and the facilitator commiserated, "it feels like we're on our own and the patient is dying in front of us and we know what they need but we can't get it."
Value 2: A cornerstone of emergency medicine is managing uncertainty	
We can identify and manage risk to combat uncertainty	For certain presentations supervisors introduced students to decision rules to help identify risk and manage uncertainty. For example, during care for the patient with whiplash the supervisor pulled up the Canadian C-Spine rules and went through how to use them with the students. This categorized the patient at low risk of having a C-spine injury. They then modeled how to explain the categorization of risk to the patient and obviated the need for further imaging.
We can manage patients without all of the information	Supervisors modeled an approach of simultaneous treatment and information gathering. When students presented the case of the infant with a SVT they were particularly focused on why the infant was in SVT and wanted to know the answer to that questions before proceeding with management. The supervising physician advised that while they are unsure at this point why that is the case, they could treat it without having all the facts. She guided them through using the diving reflex to terminate the arrhythmia. After the child was stabilized, they returned to a discussion that focused on "why."
There are not always right answers	Each case was run at least four times over the 4 days, which allowed staff involved in the simulation exercise to see how other physicians managed the same patient. There were discrepancies in patterns of practice. At one point in the pathology room, the staff reflected on the domestic violence case and how there was a range in the tests ordered, from no investigation to CT-facial bones and CT-A of the neck. Participants felt that this reflected the fact that there are many "gray" areas in medicine, rather than that any particular management plan was wrong.
Emergency physicians feel that other specialties are less comfortable with uncertainty	In this simulation exercise we were able to see evidence of how emergency physicians "package" data and patients to give to consultants. One supervisor said to the student "make sure that you have all of the details straight and results organized before your phone them [surgery] because they will want all that and might get mad." When specialists were consulted early without all available information they voiced dissatisfaction over the phone that all appropriate information was not available, again liberties taken as individuals outside the design of the simulation.
Emergency physicians feel that students are uncomfortable with uncertainty	In the first cases of each session students were quite hesitant to present to preceptors without all the information (bloodwork or imaging results). They described that they felt they should have the "answer before speaking with the boss." Supervisors often directly addressed uncertainty with students. One said, "you don't have to know exactly what is going on but you do have to have a plan." Students noted that, "it was nice to learn phrases of reassurance and how to discuss uncertainty with patients through role-modeling. We got see lots of words around the gray."
Value 3: Patients and families are at the center of care	
Emergency physicians care for any patient, anytime	The structure of the simulation exercise was such that patients ages ranged from newborn to elderly with a spectrum of disease from minor injury to life-ending (see Table 2).
Social circumstances are essential to understanding illness	After students presented the case, a frequent follow-up question from supervisors would pertain to home and social circumstances. They would spend time explaining why this context was important. It was the key aspect of a number of cases including the patient with domestic violence, patient who had overdosed, and the patient with the catastrophic hemorrhagic stroke. In the debrief the facilitator stated, during student's reflection on the importance of social circumstances, "we often are involved at the intersection of physical and social crises."

(Continued)

Table 3 (continued)

Belief	Practice
Communication with patients is important to their experience	Supervisors spent time exploring communication strategies with students. One student was responsible for breaking the bad news to the wife of the patient with the hemorrhagic stroke. The doctor reflected that they did not use the "dying" word then spent time explaining why using direct language such as "dying" or "death" is important to avoid confusion. Supervisors role modeled challenging communication strategies, particularly for the patient with delirium showing how she could be redirected and engaged with. For example, the supervisor redirected the patient by asking a question about the doll she was carrying and was able to get her back into bed in a calm manor. About 5 minutes later the students employed a similar strategy, after initially not knowing how to interact with this patient.
Symptom management is an early priority	There was often early and liberal use of analgesia and antiemetics at the prompting of both nurses and supervisors. One supervisor explained, "while we are sorting out the diagnosis, we can treat what brought them in."
The ED environment can be a less than an ideal setting for patients	This simulated ED faced some environmental constraints akin to an actual ED. The initial contact for the patient who was the victim of domestic violence was in the hallway, as that was the only clinical space available to see her. Both students and staff reflected during the exercise and in the debrief that this seemed inappropriate. Interestingly, supervisors were quite quick to justify this practice, while students remained adamant that there had to be a better way.
Value 4: Emergency physicians must be expert at balancing needs and resources at the systems level	
Efficiency is necessary, and desired	Despite the fact there was not actually any time pressure or need for efficiency, throughout the day, supervisors balanced student autonomy with supervisor intervention. In speaking with them about the balance, we heard comments such as, "it would just be faster if I did it." Or "I'm getting a bit inpatient and want to move on." Some supervisors explicitly taught students how to maximize efficiency by starting a history and physical examination on a new patient while waiting for results on the first patient that they cared for. In the debrief students reflected on the fact that this was the first time that they had to "multitask" or "care for more than one patient."
Emergency physicians should actively manage patient flow	Supervisors emphasized early decision making and identification of disposition. Students were frequently asked "do you think the patient is coming in or going home." Supervisors then explained that early identification of disposition helps with planning for that patient and for the department, it creates "forward momentum." The supervisors who were consultants would frequently "run the board" to see who they could move to the "clinical decision unit" or "short stay" to free up beds when they felt they were "bed-blocked." All this occurred despite no actual time or patient pressure.
Emergency physicians feel that other services in the hospital prohibit efficiency and efforts to manage patient flow	Students brought requisitions to the simulated pathology and radiology department and also collected results from those areas. The supervisors there would send students away saying "it hasn't been long enough" or would say phrases we occasionally hear from the laboratory such as "hmmm . . .we seem to have lost the requisition, can you fill another one out and come back in 10 minutes, we'll see what we can do" or "we are about to run the sample, come back in 15 minutes" or "the ESR machine is down." After doing so the two to three supervisors would laugh and tell a story about how that happened to them recently and how it impeded their workflow in a consequential and frustrating way.
Emergency physicians must have a strong understanding of inpatient and outpatient health resources	Throughout the simulation exercise supervisors demonstrated tacit knowledge about navigating the health care system for specific needs of patients whether that be as inpatients or outpatients. This knowledge, and ability to deftly traverse health care domains, was necessary for patients to receive the care that they needed. For example, the supervisor for the patient with urinary retention shared information with students about the trial of void clinic which would be the most appropriate outpatient follow up. In conversations about identifying appropriate disposition and consultation supervisors often shared that "part of the role of the emergency physician is getting patients where they need to be."
Value 5: A team approach is necessary to providing high quality emergency care	
Emergency physicians feel that nurses are essential to the care for patients and education of junior doctors	During the debriefs the phrase "the nurse showed me ____" came up in every session. The structure of the simulation was such that nursing staff were essential teachers for the students ranging from procedural, to navigating systems, to assessing patients, to teaching about medications. At one point the nurse told a student that he should "hold off [giving anticoagulation for the patient with STEMI] until cardiology confirmed." He advised that cardiologists often have a specific regimen that they would like emergency physicians to deliver.
Emergency physicians feel that allied health practitioners are valuable in caring for patients with complex needs	Throughout the simulation sessions the supervisors encouraged students to include allied health colleagues liberally. This included a consult to physiotherapy for a patient with back pain, consult to the social worker for the patient with domestic violence and for the patient who was dying, and contacting the coroner for the patient who died in care. When these consults were initiated the supervisors often spoke about the specific role that those professionals might play for our patients and why their role is important, particularly in more complex circumstances.
Value 6: Education is integral to emergency medicine	
Lifelong learning is necessary to being an emergency physician	Throughout the simulation exercise supervisors modeled ongoing learning. Sometimes students would ask questions that they did not know the answer to and they would say, "let's look it up together" then show the students the resources they were using to do so. Behind the scenes supervisors would collegially compare the way that they managed the same case, talking about why the ordered or didn't order specific tests.

(Continued)

Table 3 (continued)

Belief	Practice
Feedback on performance is important for ongoing growth and development	In the prebrief students were instructed to ask the supervisors directly for feedback and "continue to do that throughout your career." The suggestions that they received were to ask "how'd you think that case presentation went?" or "what could I have done better in that case?" Some of the supervisors in this case were fairly junior. Built in to the exercise was the opportunity for them to receive feedback on their supervision and teaching skills.
Simulation is a valuable educational tool	Intrinsic to the effort required to coordinate and deliver this type of large-scale simulation is that the emergency physician coordinators believe it is a valuable educational method.
Value 7: Emergency medicine is part of self-identity	
Certain personality traits make one well suited to emergency medicine	Accountability: Students described that when they had a patient assigned to them and described as "your patient" they felt like a proper doctor. One in particular said she "got excited every time a patient was assigned." As facilitators were discussing the debrief amongst themselves after one said, "you can just tell the students that you like and that would fit in the ED. You know, the kids that say they love being assigned a patient . . ." Resourcefulness: One student was caring for the patient who died. The nurse found him and asked him to declare death. I saw him go to his resource book that he brought and look up how to do it then proceed to go through the appropriate steps. His supervisor later asked how he knew what to do. When he explained that he just figured out how to solve the problem and she was very impressed. She shared his actions with many of the other facilitators who commented that he "was great." Collegiality: Throughout the day staff modeled collegiality. Supervisors introduced themselves to medical students by their first names. They offered support by saying phrases such as, "lots of help here for you buddy." The prebrief and debriefs helped students explore the positive, challenging, and confronting aspects of work with their peers in a supportive setting. Throughout the day supervisors relaxed with each other in the break room where they bonded over food.Enthusiasm: Supervisors and staff shared and modeled enthusiasm with students. In the prebrief the facilitator asked students, "what are you most excited about?" and when they returned to the debrief noted, "there are more smiles than when you started," which resulted in giggles and nods from the group. Many of the supervisors were volunteering their time to be there. One supervisor, who just participated on the second day, said she, "couldn't wait to join the fun."
Patients' stories become part of our own	As soon as students entered the debrief room, but before the debrief formally started, they began sharing patient stories and their positioning in those stories with each other. During the debrief the facilitator asked students to share their stories. In each session, this seemed to generate a significant amount of discussion that had to finally be closed with effort from the facilitator. Stories ranged from purely clinical, to reflective, to emotive.
Emergency physicians feel that they are different than their colleagues	An ED resident was on the phone pretending to be the consulting cardiologist. After she hung up the phone she turned and joked with another ED resident that she "wasn't good at being mean, I should have been harsher." This implied that she felt that in order to accurately portray her inpatient colleague she had to change her persona. I overheard the conversation and following interactions between the consultant surgeon (played by an ED resident) and medical students for a patient who had a perforated ulcer. Initially, I was sitting with the surgeon. I heard her being quite short with the students and asking for many investigations to be done before reluctantly agreeing to see the patient, "after I am done in the OR." She got off the phone and said to me, "it's a bit ridiculous, you know. I was consulted without any investigations or blood work for an ulcer. It could be anything. You know, I am in no hurry to help them. That's exactly how the surgical resident would be in real life." This brusque portrayal of a surgeon said a great deal about how emergency physicians view their colleagues and how they sometimes pride themselves in being in the trenches as opposed to on the consulting end of the phone.
Students aren't quite "us" . . . but they could be	Students seemed to identify and respect a hierarchy. Students were much less likely to approach consultants than residents to review cases and noted that they got nervous before talking to the "big doctor." The facilitator in the pathology room noted that, "the signs should have been placed on the floor because that's where they [the students] all look when they're here." In their absence, facilitators sometimes joked about students. One student called the simulated switch board and talked to a facilitator pretending to be a urology nurse from the trial and void clinic. The student said that she had "inserted a catheter and evacuated the bladder." After hanging up the facilitator burst out laughing and repeated the word "evacuate" to a room full of other physicians. They all seemed to find great pleasure in her choice of words. At times the facilitators would refer to the students and their actions as "cute" or "adorable" referencing their naiveite. Despite the hierarchy and amusement with student behavior there was an obvious desire by facilitators to make the learning experience as positive a one as possible. This was evidenced in their actions with students throughout the day but also by the fact that they were volunteering time to be present to help with teaching in this capacity. In the debrief, students were asked how they felt being supervised by the senior doctors and nurses. Responses such as, "they were so nice" or "it's nice to know that we'll have support" were frequent. There were no negative experiences about the supervision shared during the debriefs.

The practices throughout the exercise that allowed researchers to identify these beliefs and values are only representative examples from the data set.
BPH = benign prostatic hyperplasia; ECG = electrocardiogram; ESR = erythrocyte sedimentation rate;; STEMI = ST-elevation myocardial infarction; SVT = supraventricular tachycardia.

component beliefs were identified as important to emergency medicine culture but were unlikely to be transmitted to students in the exercise including "students aren't quite us . . . but they could be" and "certain personality traits make one well suited to emergency medicine."

There was agreement with the framework upon member checking with medical students, residents, and consultants who were involved with the exercise. There was no modification to the values or beliefs but a number of additional examples of practices were incorporated after consultation.

DISCUSSION

This ethnographic study identified seven values, 27 beliefs, and innumerable practices fundamental to the culture of emergency medicine. We observed how these components of culture were transmitted to undergraduate students through a simulation exercise.

Identifying the Culture of Emergency Medicine Through Simulation

The culture of emergency medicine is not well defined. In the limited studies that do exist, centrally held values are the desire to care for any patient, any time, and to provide high-quality care, as efficiently as possible.[10,14–18] Other ethnographic studies have focused on specific patient populations or areas of tension.[19–22] In the most overarching study of emergency medicine culture to date, four domains—cognitive, environmental, linguistic, and social—were found to be of particular importance when examining emergency medicine culture.[10] We focused observations in these domains, during a moment of culture compression, to further illuminate the culture of emergency medicine. In doing so, we were able to create a set of values, beliefs, and practices that illustrate fundamental aspects of emergency medicine culture.

The values and beliefs that we present are in keeping with those previously identified but significantly add to the breadth and depth of understanding. Person et al.[10] identified that within the cognitive domain, caring for critically ill patients was gratifying and that maximizing efficiency was also important. These are in keeping with our recognized values of "identifying and treating dangerous pathology is a key role of emergency physicians" and "emergency physicians must be expert at balancing needs and resources at the systems level." Our work builds by further identifying additional component beliefs including the importance of a systemized approach and our understanding of this process in relation to specialist colleagues. Person et al.[10] highlighted frustration and adaptation to the physical environment and to systems as a key component of ED culture by providing seven examples of environmental factors and adaptive practices. Our simulated environment did not face the same pressures as a functioning ED. Even so, we found that within the simulation, supervisors responded to pressures typical for their work, such as time and patient load, by actively managing "flow" even though these pressures were not actually present. They practiced all five work pressure strategies previously identified through ethnographic study.[15] In the linguistic domain, Person et al.[10] focused on the importance of team communication. We were able to expand on this area by highlighting linguistic structures that individuals use to uphold values—such as students presenting cases using a standardized format or the use of triage scores to help identify sick patients to "treat and identify dangerous pathology." We further identified the centrality of strong communication as a key belief related to the value of "patients and families at the center of care." Finally, in the social domain, Person et al. found that teamwork was vital, that there was skepticism around those new to the team, and that there were significant challenges at interdepartmental interfaces.[10] These findings were replicated in our work with four of our component beliefs reflecting negative attitudes and underlying tensions around emergency physicians' work with specialists. These likely represent microlevel value differences and conflicting organizational practices that have been found to be at the heart of professional conflict in emergency medicine.[22] There is an overwhelming correlation between the culture of our simulated ED and that of more traditional ethnographic studies performed in situ. Interestingly, these similarities cross international borders, suggesting that there are likely some values and beliefs that are fundamental to the specialty at a global level.

Sharing Cultural Knowledge: The Hidden Curriculum of Simulation

We unequivocally found that simulation acts as a mode of cultural compression. In addition to the explicit learning objectives related to knowledge and skills, we observed that the transfer of values and beliefs and demonstration of key practices occurred with

considerable frequency in a short period of time. A reflection on cultural transmission in this activity may help simulation experts consider the cultural messages that are being shared in the exercises they develop. It also provides a potential space for further investigation and translation into practice.

Simulation exercises are designed by humans who have a specific outlook on the world. Their frame affects messages broadcasted.[23,24] This simulated ED was coordinated by two emergency physicians, including author VB, who brought with them values and beliefs about their work and who are fully indoctrinated into ED culture. Certain structural components, related to the simulation design, facilitated the transmission of culture throughout the exercise. These included the wide-ranging case mix which signaled the belief that "emergency physicians care for any patient any time," the heavy involvement of nursing staff in teaching and facilitation which signaled the value that "a team approach is necessary to providing high-quality emergency care," and a consistent focus on lifelong learning in the prebrief and debrief, which signaled the value "education is integral to emergency medicine."

The decision to have emergency medicine personnel impersonate specialist and allied health colleagues was a practical one, but that choice came with the consequence of potentiating negative hidden curriculum messages through the caricatures created by individuals who were afforded the creative liberty to play the role in the way they saw fit. In doing so, this delivery decision accentuated the transfer of emergency medicine specific beliefs related to strained relationships with specialist colleagues. It highlighted how we position ourselves and perceive our colleagues within the narrative of our work. It made obvious that "emergency medicine as a component of self-identity."

The debrief is an opportunity for the transmission of explicit cultural teachings but we also found that it is key moment to gauge what values, beliefs, and practices were actually interpreted by those participating. For example, in the debrief, students reflected on specific actions and phrases they learned from their supervisors in communicating with the patient with delirium or tips they were given when trying to manage multiple patients. To those attuned to the process of cultural transmission these comments signaled that students had been exposed to and incorporated specific values, beliefs, and practices.

Overall, we show that the design and debrief of simulated activities is consequential for educators—in terms of cultural messaging. For researchers, it adds to the growing evidence that simulation may be used as a tool to further explore culture and attitudes.[25,26]

Next Steps: From Transmission Toward Understanding

In situ and translational simulation have been proposed as tools for cultural change but with limited evidence of impact to date.[27] This study adds weight to the exciting potential to facilitate cultural understanding within and between groups using simulation as we provide compelling evidence that the transmission of values and beliefs does, in fact, occur in the simulated environment. In this particular exercise, transmission took place most often through case discussions and through role modeling but was also evident in direct feedback and collective explorations in the debrief. Most transmission was unilateral—meaning that supervisors transmitted cultural understanding to medical students. When there is such an extreme hierarchy, cultural transmission is likely to be one-sided. However, we predict that when more even-footed colleagues engage, the cultural exchange is likely to look different and that it has the potential to be multidirectional. Conceivably, in some situations, we will be able to move away from transmission and toward understanding. Through further evaluation in a variety of settings, both educational and workplace, we may be able to reframe the potential for multidisciplinary and interdisciplinary simulation from one that simply tests systems, processes, communication, and teamwork, to one that also allows appreciation and reconciliations of differences in fundamental values, beliefs, and practices. Future research might build on simulation as a potential tool to address commonly observed, but poorly understood culturally rooted conflicts that arise in the interdependent and complex reality that is contemporary health care.[22,28,29]

LIMITATIONS

There are a number of limitations to our work, the most significant being potential issues with generalizability. The study took place in Australia in the context of supervisors who work in a large, tertiary care, ED, with a significant focus on education. Both medical students and supervisors engage in simulation frequently as part of their own educational programming

and as facilitators. Furthermore, the supervisors involved in the exercise were mostly volunteers, which may create a degree of selection bias and opens to the possibility of a unique set of values and beliefs among this specific cohort. All of these factors may affect the cultural milieu identified and manner in which that culture was transmitted to medical students.

The study was conducted with preclinical medical students as the simulated ED is a cornerstone exercise in their transition to clerkship, but the findings could be different if conducted at alternate levels of training or clinical experience. We capitalized on the opportunity to study emergency medicine at a moment of cultural compression, and when those who already belong were indoctrinating those outside of the group. At such moments, values and beliefs can be particularly evident because the unspoken may be spoken and invisible may be illuminated. This facilitated a more in-depth exploration of often hidden phenomena. While advantageous, the risk is that individuals involved in the focal enculturation process may behave differently than they would in day-to-day interactions in their usual workplace. We assessed that the benefits of capitalizing on this large-scale simulation exercise as a moment of cultural compression outweighed the risks of misrepresentation. Strong correlation with previous in situ findings and member checks of our value and beliefs set with the broader community are in keeping with that likelihood.

Finally, those involved in data collection and analysis, except for MC who is a medical student, come from a background of emergency medicine. Insider positioning has benefits including rapid identification of common emergency medicine practices and broad understanding of what was actually taking place in the exercise. However, there were also risks to our proximity including preconceived notions about emergency physicians and the possession of a preexisting beliefs set. An awareness of our positioning in this work likely guarded against, but is unlikely to have fully compensated for, the tendency to view our colleagues and our own culture in a positive light. In our future work, and as a suggestion to others considering similar research endeavors, we will seek to include a medical outsider, nonphysician anthropologist, or colleague from another department on the research team to broaden our perspective.

Overall, this work may assist individuals and departments identify areas for focused improvement such as understanding interdepartmental interfaces and conflict. It may also be of interest to individuals considering a career in emergency medicine as they reconcile their own values and beliefs with the various specialties they are considering joining.[30] Since culture is local, the set of values, beliefs, and practices that we present may or may not resonate. It is unlikely to be entirely comprehensive given the limitations of the simulation environment and importance of external factors that we could not recreate in affecting the way that individuals and groups behave. We encourage readers to use our findings as a launch point to explore their local emergency medicine culture. We hope that it serves as an opportunity for our profession to reflect on what we hold to be important and how our values, beliefs, and practices affect the way that we do our work and educate the next generation.

CONCLUSION

This study of a large simulated ED exercise contributes to the characterization of the culture of emergency medicine by identifying seven core values and 27 beliefs that are foundational to the specialty. The simulation facilitated cultural compression, which allowed for ready identification of values, beliefs and practices and also facilitated rapid transmission of culture to learners. This study expands understanding of the culture of emergency medicine and the role of simulation in the process of cultural exchange. It has implications for educators, researchers, and clinical leaders seeking to understand and shape culture in health care environment.

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